William Chen, director for NTU's food science & technology programme, and research fellow Jaslyn Lee, used durian seeds to develop a natural food stabiliser enhanced with probiotics.
PHOTO: NTU

Research and entrepreneurship *can* be bedfellows

Research and teaching feed into university rankings, but attention should be paid to pursuing enterprise. This links academia with industry, and stimulates economic activity. **BY FOO MAW-DER**

WITH the knowledge-based economy depending on research, innovation and enterprise to thrive, many universities around the world have become increasingly involved in a third mission: Engaging in entrepreneurship activities.

In the past decade, a growing number of academics have been actively involved in this third mission, even as their traditional missions, research and teaching, remain important for their KPIs (key performance indicators).

In Singapore, like elsewhere, the third mission has yielded tangible dividends, with university scientists developing innovative products that not only have commercial potential but also benefit the community, such as technology that can 3D-print a bathroom unit within a day, or an imaging probe that allows for earlier detection of acute kidney failure.

The benefits of the third mission are certainly not to be scoffed at, since academic enterprises can stimulate economic activity, generate jobs, provide additional sources of financing for universities and build ties between universities and industries.

The manufacturing sector here, for example, has become globally competitive because of the close partnership between universities/research institutes and the industry, as noted by Deputy Prime Minister Heng Swee Keat at a conference on materials for advanced technologies in June.

Despite the benefits, a university's third mission often comes with its own set of challenges, especially for enterprising scientists who still have to teach and research at the university, even as they strive to generate commercial outcomes from their research.

And trying to balance research and entrepreneurship may be tricky business for some scientists at a time when universities are preoccupied – critics would even say obsessed – with global university rankings.

These rankings often place an inordinate emphasis on evaluating universities' research output. In the Times Higher Education World Rankings, one of the world's most-recognised rankings, research and citations contribute to 60 per cent of a university's performance.Teaching measures account for just 30 per cent.

The irony is that enterprising scientists who are keen to have their inventions or innovations patented may not be able to publish their research findings.This is because once their findings become part of the public domain, the research is no longer patentable. Hence, a research scientist's unpublished findings – even though they might address an important medical or social need – may not be counted as part of the university's research output by the various ranking bodies.

Despite such inherent tensions between a university's two missions, a study I published with my colleagues in 2015 found that pursuing research excellence and promoting research commercialisation did not have to be achieved at the expense of one or the other. This is especially so if the university has a culture which supports its faculty's enterprising aspirations.

STARTUP ASPIRATIONS

Such aspirations include the setting up of the research scientist's own venture (startup aspirations), promoting technology transfer from the university laboratory to industry (industry-science aspirations), and pursuing patents and licences for the research outcomes.

The study found that research scientists viewed scientific productivity, in the form of engaging in research (the second mission), as vital to his/her industry-science aspirations.

Higher levels of scientific productivity tend to make the researchers feel more confident of their scientific abilities, a *sine qua non* for successful commercialisation of activities.

Conversely, an academic who has not engaged in intensive scientific research may not feel confident of his/her ability to commercialise research, since such low engagement is unlikely to lead to breakthrough findings with commercialisation potential.

In patenting, a scientist's ability to patent-protect his research or invention is both highly dependent on the novelty of the research results and the usefulness of the invention, such as the case in which a team of researchers from the Nanyang Technological University (NTU) found a way to turn durian seeds into a food stabiliser and probiotics.

In the study, the participants were required to complete an online questionnaire to assess their enterprising aspirations.

They were asked to respond to statements or questions such as "My professional goal is to become an entrepreneur", "How likely will you engage in contract research with industry?" and "How likely will you apply for a patent over the next five years?".

The responses were rated between one (disagree to a large extent/unlikely) and seven (agree to a large extent/likely).

Based on the responses, research scientists who were more productive in releasing their findings also had higher levels of startup aspirations and industry-science interaction inspirations, the study noted.

It also found that stronger enterprising norms at the department level in a university would help strengthen the enterprising aspirations of the research scientists' in the department.

Hence, while universities continue to keep an eagle eye on rankings – since that is what all other stakeholders are doing too – they should continue to encourage and facilitate entrepreneurship activities, even if this may not be accorded as much weight in the rankings. This may include setting up dedicated units, such as what the NTU has done. Its innovation and enterprise arm, NTUitive, helps its scientists to take their research outcomes to the marketplace and also manages their intellectual property assets; the Nanyang Technopreneurship Centre offers technology education to nurture a culture of innovation and entrepreneurship activities.

Given the important role that a university's third mission can play in helping industries to come up with innovative solutions for the myriad of challenges we face today, from ageing to climate change – perhaps the day is not far off when it will be given due consideration in "ranking" a university.

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